1.0 Purpose and Scope

1.1 This procedure describes the analysis of beverage samples by headspace gas chromatography for ethyl alcohol.

1.2 The scope of this procedure includes sample preparation, instrument set-up, analysis and associated QC requirements.

2.0 Responsibility

2.1 All analysts having the responsibility for analysis of samples for alcohol content are responsible for following this procedure.

2.2 This procedure is reviewed periodically by the Alcohol Program staff. Necessary revisions are made at that time or when there is an identified need to change this written procedure to be compatible with changing needs in the analytical process.

2.3 All analysts performing this procedure for the purpose of reporting analytical results for forensic purposes must be fully trained and demonstrate initial competency in the use of this procedure. Refer to Section 6.0 regarding competency and proficiency testing.

3.0 Precautions and Safety Directives:

3.1 Prepared samples can be held at room temperature before analysis is begun for a maximum of 48 hours after preparation. Samples are typically analyzed within 24 hours of preparation.

4.0 Procedure

4.1 Principle of Measurement

4.1.1 Refer to ALC_P102_Alcohol Analysis by Headspace GC-FID.

4.2 Equipment & Materials

4.2.1 All equipment and materials are located in rooms 265 and 266.

4.2.2 Agilent Technologies 6890N Gas Chromatograph with flame ionization detector.

4.2.3 Teledyne-Tekmar HT3 Headspace Autosampler.

4.2.4 Desktop PC and printer with ChromPerfect Spirit Chromatography and HT3 TekLink Software Packages.

4.2.5 Compressed Hydrogen-UHP Grade.

4.2.6 Compressed Helium-UHP Grade.

4.2.7 Compressed Air.

4.3 Sample and Control Preparation

4.3.1 Prepare calibration and control samples as described in ALC_P101_Sample Preparation for Alcohol Analysis.

4.3.1.1 A blank and QC control in a similar matrix should be prepared and analyzed along with the evidentiary samples.

4.3.2 Beverage samples may need to be diluted with dH_2O appropriately so that all results fall between the lowest and highest calibration points.

4.3.3 After dilution, prepare samples as described in ALC_P101_Sample Preparation for Alcohol Analysis.

4.3.4 Sample results must be reported as percent volume per volume. Review results as described in ALC_P103_Alcohol Analysis Data Review and Reporting.

4.3.4.1 Correct the result for the dilution factor used. Divide this corrected value by 0.789, the density of ethanol at 20°C, to obtain the percent volume per volume units.

4.4 Data System Setup

4.4.1 Set up the ChromPerfect Spirit Chromatography data system as described in the Instrument Maintenance Log.

4.4.2 Save a copy of the calibration file.

4.5 Chromatograph Setup

4.5.1 Assure that the Helium carrier gas is turned on with an appropriate delivery pressure (approximately 45 psi) and that the amount remaining in the supply cylinder is at 500 psi or greater. If not, replace the tank.

4.5.2 Assure that the Air tank is turned on with an appropriate delivery pressure (approximately 45 psi) and that the remaining cylinder pressure is at 200 psi or greater. If not, replace the tank.

4.5.3 Assure that the Hydrogen fuel tank is turned on with an appropriate delivery pressure (approximately 18 psi) and that the remaining cylinder pressure is at 200 psi or greater. If not, replace the tank.

4.5.4 Ensure that the FID flame is lit and the GC status is “Ready for injection”.

4.5.5 Review all operating parameters and adjust as necessary to assure they agree with the settings listed in the Instrument Maintenance Log.

4.6 Autosampler Setup

4.6.1 Review all operating parameters and adjust as necessary to assure they agree with the settings listed in the Instrument Maintenance Log.

5.0 Emergency or High Priority Situations

5.1 The Commissioner of Public Safety, Laboratory Director or Alcohol Program Supervisor can designate samples as high priority.

5.2 High priority samples are analyzed as soon as possible after successful calibration.

5.3 Priority sample results are reviewed and released as soon as they are available, once they pass the quality assurance criteria.

6.0 Quality Criteria and Corrective Action

6.1 Analysts will assure that an adequate amount of sample processing supplies are on hand at all times. Orders should be placed when supplies are low to ensure that new stock arrives before supplies are completely empty.

6.2 All analysts performing this procedure must analyze at least one set of proficiency samples per year. Analysts trained in blood alcohol GC headspace analysis do not need to take a separate beverage alcohol proficiency test annually. New analysts must complete an initial demonstration of competency.

7.0 Backup Procedures

7.1 If the secure storage refrigerator in room 155A is not functioning, the refrigerator in room 266 may be used to store samples, or vice versa.

7.2 If the Vermont Forensic Laboratory lacks analytical ability for greater than 10 business days, samples will be sent to a qualified reference lab for analysis.

8.0 References

8.1 ALC_P101_Sample Preparation for Alcohol Analysis.

8.2 ALC_P102_Alcohol Analysis by Headspace GC-FID.

8.3 ALC_P103_Alcohol Analysis Data Review and Reporting

8.4 Instrument Maintenance Log.

DOCUMENT HISTORY			
DATE	**VERSION**	**APPROVED BY**	**ACTIVITY OR REVISION**
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